

AMENDMENTS TO THE CLAIMS

1 1. (Currently amended) A network device-based method comprising:  
2 determining and retaining, upon receiving acknowledgement of receipt of new data,  
3 an excess number of duplicate acknowledgements based upon a count of consecutive  
4 duplicate acknowledgement packets; and  
5 taking a network packet transmission recovery action based upon said excess number  
6 of duplicate acknowledgements. [[; and]]  
7 ~~storing said excess number of duplicate acknowledgements as a number of duplicate~~  
8 ~~acknowledgements.~~

1 2. (Currently amended) The network device-based method of Claim 1 further  
2 comprising:  
3 determining whether a congestion window is inflated prior to ~~said determining an~~  
4 deciding whether to determine said excess number of duplicate  
5 acknowledgements.

1 3. (Original) The network device-based method of Claim 1 wherein said taking a  
2 network packet transmission recovery action further comprises:  
3 deflating a congestion window upon said value of said excess number of duplicate  
4 acknowledgements in bytes being less than a number of bytes in a transmission  
5 control protocol sender segment.

1 4. (Original) The network device-based method of Claim 1 wherein said taking a  
2 network packet transmission recovery action further comprises:  
3 optimizing a size of a congestion window to match a reduction in a quantity of  
4 unacknowledged data upon said excess number of duplicate acknowledgements being

5 greater than a TCP sender segment.

1 5. (Original) The network device-based method of Claim 1 wherein said taking a  
2 network packet transmission recovery action further comprises:  
3 comparing said excess number of duplicate acknowledgements with a duplicate  
4 acknowledgement threshold.

1 6. (Original) The network device-based method of Claim 5 wherein said taking a  
2 network packet transmission recovery action further comprises:  
3 performing a fast retransmit upon said comparing said excess number of duplicate  
4 acknowledgements with a duplicate acknowledgement threshold indicating  
5 that said excess number of duplicate acknowledgements is greater than or  
6 equal to said duplicate acknowledgement threshold.

1 7. (Original) The network device-based method of Claim 6, wherein said taking a  
2 network packet transmission recovery action further comprises:  
3 analyzing a size of a congestion window.


1 8. (Original) The network device-based method of Claim 7, wherein said taking a  
2 network packet transmission recovery action further comprises:  
3 resizing said congestion window upon said analyzing said size of said congestion  
4 window showing said size is greater than a predefined size.

1 9. (Original) The network device-based method of Claim 5, wherein said taking a  
2 network packet transmission recovery action further comprises:  
3 analyzing a size of a congestion window upon said comparing said excess number of  
4 duplicate acknowledgements with a duplicate acknowledgement threshold

5 indicating that said excess number of duplicate acknowledgements is less than  
6 said duplicate acknowledgement threshold.

1 10. (Original) The network device-based method of Claim 9, wherein said taking a  
2 network packet transmission recovery action further comprises:  
3 resizing said congestion window upon said analyzing said size of said congestion  
4 window showing said size is greater than a predefined size.

1 11. (Original) The network device-based method of Claim 1 wherein said method is  
2 included in Transmission Control Protocol congestion avoidance.

 1 12. (Currently amended) A network device-based method comprising:  
2 determining and retaining, upon receiving acknowledgement of receipt of new data,  
3 an excess number of duplicate acknowledgements based upon a count of  
4 consecutive duplicate acknowledgement packets;  
5 deflating a congestion window upon said value of said excess number of duplicate  
6 acknowledgements being less than a transmission control protocol sender  
7 segment; and  
8 optimizing a size of said congestion window to match a reduction in a quantity of  
9 unacknowledged data upon said excess number of duplicate  
10 acknowledgements being greater than a transmission control protocol sender  
11 segment. [[; and]]  
12 ~~storing said excess number of duplicate acknowledgements as a number of duplicate~~  
13 ~~acknowledgements.~~

1 13. (Original) The network device-based method of Claim 12 further comprising:  
2 comparing said excess number of duplicate acknowledgements with a duplicate

3 acknowledgement threshold upon said excess number of duplicate  
4 acknowledgements in bytes being greater than a number of bytes in a TCP  
5 sender segment.

1 14. (Original) The network device-based method of Claim 13 further comprising:  
2 performing a fast transmit upon said comparing said excess number of duplicate  
3 acknowledgements with a duplicate acknowledgement threshold indicating  
4 that said excess number of duplicate acknowledgements is greater than or  
5 equal to said duplicate acknowledgement threshold.

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1 15. (Original) The network device-based method of Claim 14 further comprising:  
2 analyzing a size of said congestion window.

1 16. (Original) The network device-based method of Claim 15 further comprising:  
2 resizing said congestion window upon said analyzing said size of said congestion  
3 window showing said size is greater than a predefined size.

1 17. (Original) The network device-based method of Claim 12 further comprising:  
2 analyzing a size of said congestion window upon said comparing said excess number  
3 of duplicate acknowledgements with a duplicate acknowledgement threshold  
4 indicating that said excess number of duplicate acknowledgements is less than  
5 said duplicate acknowledgement threshold.

1 18. (Original) The network device-based method of Claim 17 further comprising:  
2 resizing said congestion window upon said analyzing said size of said congestion  
3 window showing said size is greater than a predefined size.

1 19. (Original) The network device-based method of Claim 12 wherein said method is

included in Transmission Control Protocol congestion avoidance.

20. (Original) A transmission control protocol method comprising:  
performing a TCP fast recovery process; and  
performing a TCP fast recovery extended process upon receiving acknowledgement  
of receipt of new data in said TCP fast recovery process.

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21. (Currently amended) A network device comprising:  
a processor; and  
a memory coupled to said processor, and storing a fast recovery extended method  
wherein upon execution of said fast recovery extended method by said processor,  
causes said network device to: a fast recovery process is extended.  
determine, upon receiving acknowledgement of receipt of new data, an excess  
number of duplicate acknowledgements based upon a count of  
consecutive duplicate acknowledgement packets;  
retain said excess number of duplicate acknowledgements in said memory;  
and  
take a network packet transmission recovery action based upon said excess  
number of duplicate acknowledgements.

22. (Canceled)

23. (Currently amended) The network device of Claim ~~[[22]]~~ 21, wherein said fast  
recovery extended method further comprises:  
determining whether a congestion window is inflated prior to ~~said determining an~~  
deciding whether to determine said excess number of duplicate  
acknowledgements.

1 24. (Currently amended) The network device of Claim [[22]] 21, wherein said taking a  
2 network packet transmission recovery action further comprises:  
3 deflating a congestion window upon said value of said excess number of duplicate  
4 acknowledgements in bytes being less than a number of bytes in a  
5 transmission control protocol sender segment.

1 25. (Currently amended) The network device of Claim [[22]] 21, wherein said taking a  
2 network packet transmission recovery action further comprises:  
3 optimizing a size of a congestion window to match a reduction in a quantity of  
4 unacknowledged data upon said excess number of duplicate  
5 acknowledgements being greater than a TCP sender segment.

1 26. (Currently amended) The network device of Claim [[22]] 21, wherein said taking a  
2 network packet transmission recovery action further comprises:  
3 comparing said excess number of duplicate acknowledgements with a duplicate  
4 acknowledgement threshold.

1 27. (Original) The network device of Claim 26 wherein said taking a network packet  
2 transmission recovery action further comprises:  
3 performing a fast retransmit upon said comparing said excess number of duplicate  
4 acknowledgements with a duplicate acknowledgement threshold indicating  
5 that said excess number of duplicate acknowledgements is greater than or  
6 equal to said duplicate acknowledgement threshold.

1 28. (Original) The network device of Claim 27, wherein said taking a network packet  
2 transmission recovery action further comprises:

3 analyzing a size of a congestion window.

1 29. (Original) The network device of Claim 28, wherein said taking a network packet

2 transmission recovery action further comprises:

3 resizing said congestion window upon said analyzing said size of said congestion

4 window showing said size is greater than a predefined size.

1 30. (Original) The network device of Claim 26, wherein said taking a network packet

2 transmission recovery action further comprises:

3 analyzing a size of a congestion window upon said comparing said excess number of

4 duplicate acknowledgements with a duplicate acknowledgement threshold

5 indicating that said excess number of duplicate acknowledgements is less than

6 said duplicate acknowledgement threshold.

1 31. (Original) The network device of Claim 30, wherein said taking a network packet

2 transmission recovery action further comprises:

3 resizing said congestion window upon said analyzing said size of said congestion

4 window showing said size is greater than a predefined size.

1 32. (Currently amended) The network device of Claim ~~[[22]]~~ 21, wherein said method is

2 included in Transmission Control Protocol congestion avoidance.

1 33. (Currently amended) A programmable memory including a fast recovery extended

2 method wherein said fast recovery extended method upon execution comprises:

3 determining and retaining, upon receiving acknowledgement of receipt of new data,

4 an excess number of duplicate acknowledgements based upon a count of

5 consecutive duplicate acknowledgement packets; and

6 taking a network packet transmission recovery action based upon said excess number  
7 of duplicate acknowledgements. [[; and]]  
8 ~~storing said excess number of duplicate acknowledgements as a number of duplicate~~  
9 ~~acknowledgements.~~

1 34. (Original) A network device comprising:

2 means for performing a TCP fast recovery process; and

3 means for performing a TCP fast recovery extended process upon receiving

4 acknowledgement of receipt of new data in said TCP fast recovery process.

1 35. (Currently amended) A network device comprising:

2 means for determining, upon receiving acknowledgement of receipt of new data, an

3 excess number of duplicate acknowledgements based upon a count of consecutive

4 duplicate acknowledgement packets;

5 means for retaining said excess number of duplicate acknowledgements; and

6 means for taking a network packet transmission recovery action based upon said excess

7 number of duplicate acknowledgements. [[; and]]

8 ~~means for storing said excess number of duplicate acknowledgements as a number of~~

9 ~~duplicate acknowledgements.~~